

Abstract

5 A process for enhancing chemical stability and corrosion resistance is described for perforated current collectors made by continuous production processes for use in electrochemical cells, including storage batteries such as lead-acid batteries. The process relies on utilizing a strip processing method, selected from the group of reciprocating expansion, rotary expansion and punching, to perforate the solid metal strip to form a grid or mesh, as a deformation treatment. The perforation- deformation treatment is followed in rapid succession by a heat-treatment to obtain a recrystallized microstructure in the current collector and optionally by quenching to rapidly reduce the temperature to below approximately 80°C. The process yields an improved microstructure consisting of a high frequency of special low Σ CSL grain boundaries (>50%), exhibiting significantly improved resistance to intergranular corrosion and cracking. Perforated current collectors produced with this process from a solid lead-alloy strip exhibit superior growth and corrosion properties when employed as positive grids in a lead-acid battery.